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Some leaf-mining Lepidoptera from the Aksu Dzhabagly Reserve (western Tian Shan) with the descriptions of four new species (Lepidoptera : Nepticulidae, Bucculatricidae)

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Summary

Twenty species of leaf-mining Lepidoptera belonging to the families Nepticulidae, Bucculatricidae, Lyonetiidae, Gracillariidae and Elachistidae from the western Tian Shan Mountains, Kazakhstan, are discussed. *Stigmella trisyllaba* Puplesis, sp.n., *S. talassica* Puplesis, sp.n., *Ectoedemia rosiphila* Puplesis, sp.n. (Nepticulidae) and *Bucculatrix tianshanica* Seksjaeva, sp.n. (Bucculatricidae) are described. Short diagnoses and figures of the genitalia of the species occurring in the Aksu Dzhabagly Reserve are provided.

Résumé

Les auteurs étudient vingt espèces de Lépidoptères dont les chenilles sont mineuses dans les feuilles, espèces provenant de la partie occidentale des Monts Tian Shan au Kazakhstan, et appartenant aux familles suivantes : Nepticulidae, Bucculatricidae, Lyonetiidae, Gracillariidae et Elachistidae. Description de *Stigmella trisyllaba* Puplesis, sp.n., *S. talassica* Puplesis, sp.n., *Ectoedemia rosiphila* Puplesis, sp.n. (Nepticulidae) et *Bucculatrix tianshanica* Seksjaeva, sp.n. (Bucculatricidae). De brèves diagnoses sont fournies et les genitalia figurés pour les espèces trouvées dans la réserve d'Aksu Dzhabagly.

Zusammenfassung

Es werden 20 blattminierende Lepidopteren Arten (Nepticulidae, Bucculatricidae, Lyonetiidae, Gracillariidae und Elachistidae) untersucht. Neu beschrieben werden *Stigmella trisyllaba* Puplesis, sp.n., *S. talassica* Puplesis, sp.n., *Ectoedemia rosiphila* Puplesis, sp.n. (Nepticulidae) und *Bucculatrix tianshanica* Seksjaeva, sp.n. (Bucculatricidae). Kurzdiagnosen und Abbildungen der Arten aus dem westlichen Tienschan werden hinzugefügt.

Introduction

The Aksu Dzhabagly Reserve is situated in the western part of the Tian Shan Mountains (42°20'N, 70°35'E ; Fig. 1), on the Kazakhstan side of the Talasskiy Alatau Ridge (1300 - 4200 m.a.s.l.). The flora of the reserve is rather rich and consists of about 1400 species, belonging to 474 genera from 84 families (Kovshar & Ivaschenko, 1990). Floristic and climatological conditions of the Aksu Dzhabagly Reserve are almost the same in all western Tian Shan, and appear to be comparable to the more southern mountainous territories (northern and central Tajikistan). However, the fauna of the main families of leaf-mining Lepidoptera from western Tian Shan (including the Aksu Dzhabagly Reserve) has not yet been studied.

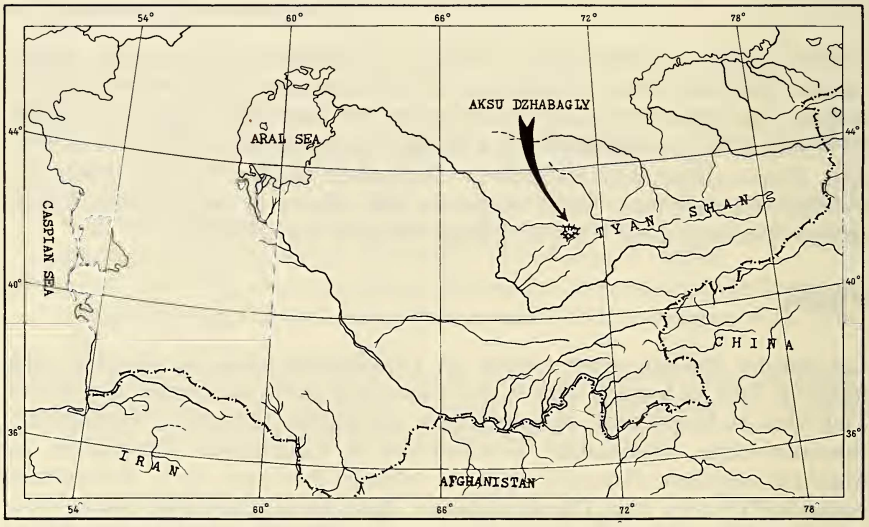


Fig. 1. Map of Central Asia showing the location of the Aksu Dzhabagly Reserve.

Twenty leaf-mining species of microlepidoptera were collected in the Aksu Dzhabagly Reserve in August 1987. Four of them are new and are described here. Genitalia were studied in glycerin. Terminology of external and genital structures follows that of recent literature (Traugott-Olsen & Nielsen, 1977 ; Seksjaeva, 1981 ; Kuznetsov, 1981 ; Kuznetsov et al., 1988 ; Johansson et al, 1990).

LIST OF SPECIES

Nepticulidae

1. *Stigmella luteella* (Stainton, 1857) (Fig. 2)

Diagnosis : Male genitalia very similar to those of *S. titivillitia* Kemperman & Wilkinson, *S. attenuata* Puplesis and to a certain extent also *S. glutinosae* (Stainton). From *S. attenuata* and *S. glutinosae* it can be separated by the shape of the transtilla and valva ; from *S. titivillitia* by the shorter anterior arms of the gnathos. From the similar *S. sakhalinella* Puplesis and *S. cathepostis* Kemperman & Wilkinson, easily distinguished by the considerable anterior emargination of the vinculum. From all other species of the *S. betulicola* species-group it can be separated by the absence of distinct sublateral processes (or any other projections) of the transtilla.

Material : 2 ♂♂, 3 ♀♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 8-11.VIII.1987, leg. R. Puplesis.

Distribution : Throughout Europe, from Ireland to northern Italy and Yugoslavia, as well as in western Tian Shan and far eastern Russia (Sakhalin).

2. *Stigmella bicolor* Puplesis, 1988 (Fig. 3)

Diagnosis : Characterised by the colouration of the forewing (especially the female) : Base of wing creamy golden or dark creamy with golden lustre, apex of forewing brownish black. The structure of the male genitalia closely resembles that of *S. aceris* (Frey), but it can be distinguished by the shape of the valva (e.g. short ventral process).

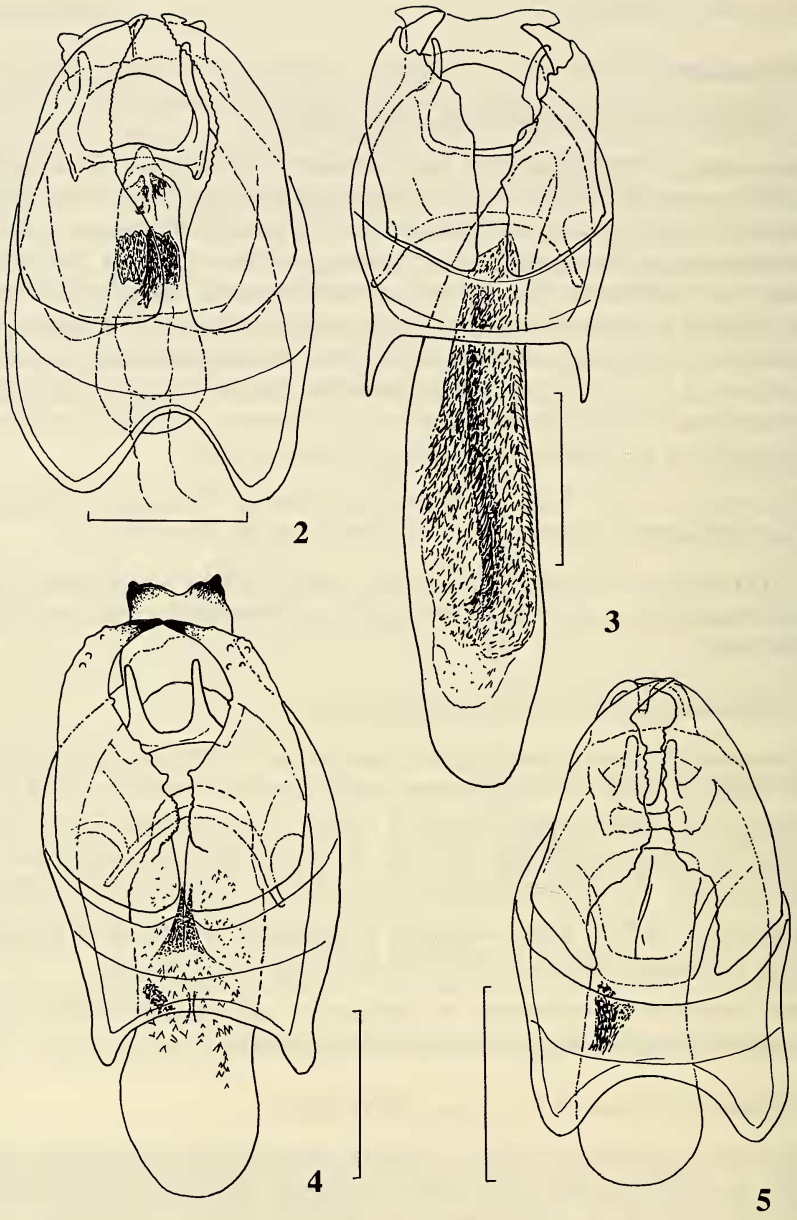
Material : 2 ♂♂, 3 ♀♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 8-19.VIII.1987, leg. R. Puplesis.

Distribution : Mountains of Tajikistan and western Tian Shan (southern Kazakhstan, and possibly Kyrgyzstan).

3. *Stigmella klimeschi* Puplesis, 1988 (Fig. 4)

Diagnosis : Belongs to the *S. malella* species group, but differs from other members of this group in the strongly sclerotized distal process of valva and uncus, the absence of aculeate cornuti in aedeagus and in the irrorate forewings.

Material : 2 ♂♂, 2 ♀♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 7-11.VIII.1987, leg. R. Puplesis.



Figs 2-5. Male genitalia of *Stigmella* spp. (Nepticulidae) : 2 — *S. luteella* (Stt.) ; 3 — *S. bicolor* Pupl. ; 4 — *S. klimeschi* Pupl. ; 5 — *S. anomalella* (Goeze) (scale : 0.1 mm).

Distribution : Mountains of Tajikistan and western Tian Shan. Also occurring in western Caucasus.

4. *Stigmella anomalella* (Goeze, 1783) (Fig. 5)

Diagnosis : Closely related to *S. centifoliella* (Zeller), but differs from this species in the absence of the forewing fascia. Can be separated from *S. spinosissimae* (Waters) by blackish scales at the base of the forewing.

Material : 2 ♂♂, 1 ♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 20.VIII.1987, larvae in *Rosa fedtschenkoana* and *Rosa* sp., N 4111 and N 4115, leg. R. Puplesis & J. Puplesiene.

Distribution : Throughout Europe and western Asia, also in the mountains of western and central Tian Shan and in the far east of Russia (Primorskiy Kray).

5. *Stigmella rolandi* van Nieukerken, 1991 (Fig. 6)

Diagnosis : Differs from the closely related *S. muricatella* (Klimesch) by the slender distal process of the valva and long slender sublateral processes of the transtilla ; from all other species of the *S. sanguisorbae* species group easily distinguished by the absence of long aculeate cornuti.

Material : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 19.VIII.1987, leg. R. Puplesis.

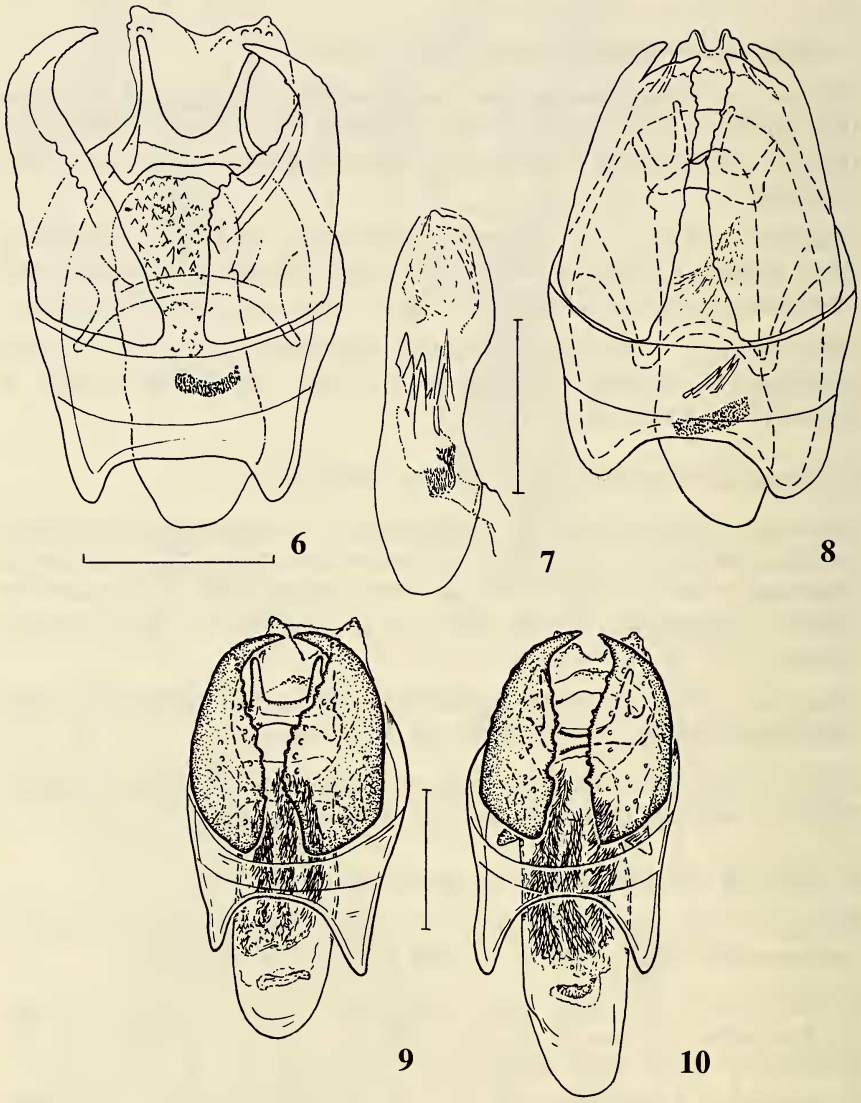
Distribution : Common in southern Europe (including the Crimea). Occurs in western Tian Shan, but possibly not common.

6. *Stigmella trisyllaba* Puplesis, **sp.n.** (Figs. 9-10)

Holotype : ♂, Tajikistan, 18 km S. Shakhristan (northern slope of Turkestanskiy ridge), 1800 m, 18.VIII.1986, leg. R. Puplesis.

Paratypes : 4 ♂♂, same data as holotype ; 3 ♂♂, Tajikistan, 30 km N. Dushanbe (Gissarskiy ridge), 1200 m, 28.VI.-7.VII.1986, leg R. Puplesis ; 16 ♂♂ same locality, 6-21.VIII.1986, leg. R. Puplesis ; 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 9.VIII.1987, larva in *Rosa* sp., N 4111, leg. R. Puplesis.

Diagnosis : Belongs to the *S. sanguisorbae* species group. Most closely resembling *S. sanguisorbae* (Wocke) and *S. thuringiaca* (Petry), but differs from these in the cornuti, which are distributed in three long bands in the new species. Differs from *S. thuringiaca* in the broad



Figs 6-10. Male genitalia of *Stigmella* spp. (Nepticulidae): 6 — *S. rolandi* VAN NIEUKERKEN; 7 — *S. salicis* (STT.), aedeagus; 8 — male genitalia; 9 — *S. trisyllaba*, holotype; 10 - the same, paratype, Tajikistan, 30 km N. Dushanbe, 21.VIII.1986 (scale 0.1 mm).

sublateral process of the transtilla. Easily distinguished from all other species of the group by the aculeate cornuti.

Male : Forewing length 1.7-2.3 mm. Head : frontal tuft brown, sometimes with some paler scales ; collar and eye-caps creamy or whitish ; antennae brownish. Thorax and forewing creamy brown. Cilia and hindwing creamy brown to creamy white.

Female : Unknown.

Male genitalia : (Figs 9-10). valva slightly variable. Sublateral processes of transtilla short and broad. Small aculeate cornuti distributed in three long bands.

Biology : Host plant *Rosa* sp. Larvae are to be found in August. Mine a long sinuous gallery, usually crossing over or turning back on earlier workings. The gallery is at first narrow and almost completely filled with dark or black frass ; later it widens appreciably. The black frass may be coiled, smeared or form a central line, but always leaving broad clear margins. Egg on underside of leaf. Cocoon brownish. Adults fly in July-August.

Distribution : Turkestanskiy and Gissarskiy ridges, Tajikistan, and western and central Tian Shan (Kazakhstan and Kyrgyzstan).

7. *Stigmella montana* Puplesis, 1991

Diagnosis : Belongs to the *S. paradoxa* species group. Differs from other species of the group in the apex of the valve, which is small and pointed.

Material : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 15.VIII.1987, leg. R. Puplesis.

8. *Stigmella salicis* (Stainton, 1854) (Figs 7-8)

Diagnosis : Belongs to the *S. salicis* species group. Differs from *S. zelleriella* (Snellen) in wing colouration, from *S. myrtilella* (Stainton) and especially from *S. benanderella* (Wolff) in the shape of the apical part of the valva and apophyses of the female genitalia ; also differs from *S. myrtilella* in its biology. Distinguished from *S. aiderensis* Puplesis by the shape of the inner lobe of the valva and the transtilla ; from *S. kondarai* Puplesis and *S. juratae* Puplesis by external features and the shape of the uncus, transtilla, gnathos and vinculum.

Material : 117 ♂♂, 125 ♀♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 7-12.VIII.1987, leg. R. Puplesis and J. Puplesiene.

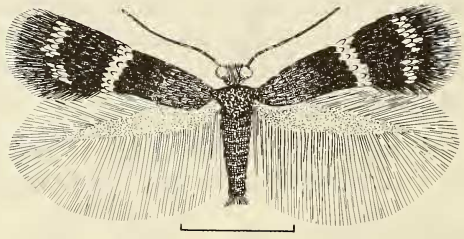
DISTRIBUTION : Throughout northern and central Europe and very abundant in western Tian Shan ; it may also occur in Siberia.

9. *Stigmella talassica* PUPLESIS, **sp.n.** (Figs 11-15)

HOLOTYPE : ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 11.VIII.1987, leg. R. PUPLESIS.

DIAGNOSIS : Belongs to the *S. marginicolella* species group. Easily distinguished by the shining silvery terminal spots of the forewing, large compact cluster of needle-like cornuti in the aedeagus and the shape of the valva (inner lobe bulged).

MALE (Fig. 11) : Forewing length approx. 1.7 mm. Head : frontal tuft pale brownish orange ; collar and eye-caps creamy (or creamy yellow) ;



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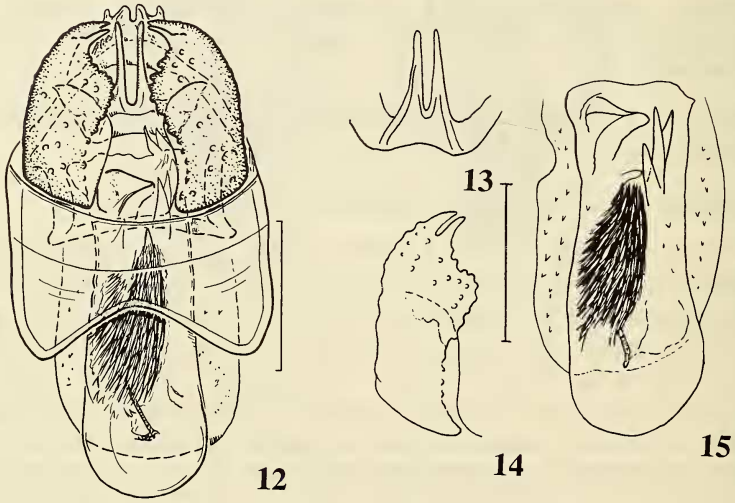

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Figs. 11-15. *Stigmella talassica* PUPLESIS sp.n. (Nepticulidae) : 11 — imago (scale 1 mm) ; 12 — male genitalia ; 13 — the same, gnathos ; 14 — the same, valva ; 15 — the same, aedeagus (scale : 0.1 mm).

antennae greyish brown. Thorax brownish. Forewing with shining silvery postmedial fascia and two shining terminal spots. Basal area of forewing brownish golden, otherwise distinctly darker, brown with purple lustre. Cilia brownish grey or greyish at tips. Hindwing including cilia brownish grey.

Female : Unknown.

Male genitalia (Figs 12-15) : Inner lobe of valva bulged. Sublateral processes of transtilla not distinctly developed. Lateral lobes of vinculum broad. Aedeagus with 4-5 large horn-like cornuti distally, and with large cluster of needle-like cornuti medially. Manica distinctly spiculate.

Biology : Holotype taken in August. Otherwise unknown.

Distribution : Known only from the Talassky-Alatau ridge in western Tian Shan.

10. *Ectoedemia rosiphila* Puplesis, **sp.n.** (Figs 16-17)

Holotype : ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 20.VIII.1987, larva in *Rosa* sp., leg. R. Puplesis.

Diagnosis : Belongs to *E. angulifasciella* species group. The new species differs in the form of the mine and in the very long sublateral processes of the transtilla and very short vinculum.

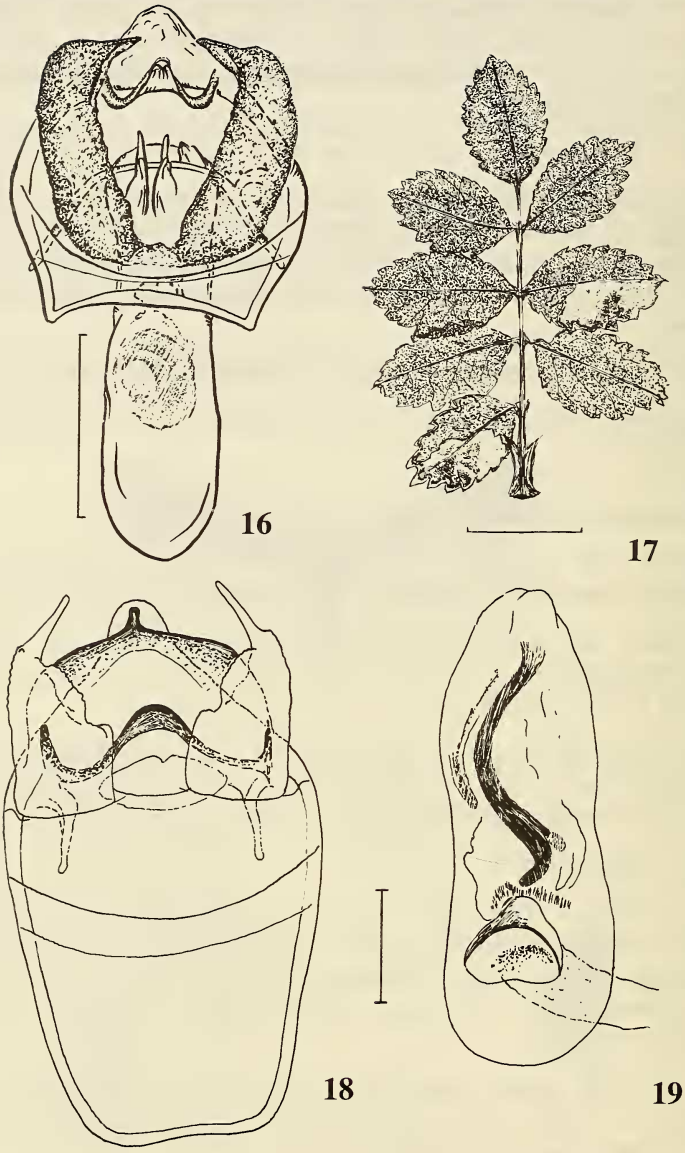
Male : Forewing length 1.8 mm (wing of holotype slightly damaged). Forewing irrorate with brown scales and with whitish median fascia. Cilia creamy brown. Hindwing without hair-pencil, cilia brownish.

Female : Unknown.

Male genitalia (Fig. 16) : Valva arcuate at apex ; triangular distal processes bent towards each other. Sublateral processes of transtilla very slender and very long, transverse bar slender. Vinculum very short ; lateral lobes weakly developed, almost absent. Aedeagus with two ventral carinae.

Biology : Host plants *Rosa fedtschenkoana, Rosa* sp. Larvae are to be found in August. First part of mine a narrow gallery with black frass in a dotted central line, then changing abruptly into an oval blotch with more or less dispersed frass.

Distribution : Known only from western Tian Shan. The species may have a wide distribution in the mountainous areas of Central Asia,



Figs 16-19. Nepticulidae : 16 — *Ectoedemia rosiphila* Puplesis, sp.n., male genitalia (scale : 0.1 mm) ; 17 — the same, mines on *Rosa* sp. (scale : 1 cm) ; 18 — *Glaucolepis raikhonae* Pupl., genital capsule (scale : 0.1 mm) ; 19 — the same, aedeagus (scale : 0.1 mm).

as numerous similar mines have been collected in northern and central Tajikistan.

11. *Glaucolepis raikhonae* Puplesis, 1985 (Figs 18-19)

Diagnosis : Belongs to the *G. raikhonae* species group. Easily distinguished by the absence of an androconial patch on the underside of the male forewing and by the long cornutus, which in contrast to *G. melanoptera* (van Nieukerken & Puplesis) has no sclerotized apodemes distally.

Material : 11 ♂♂, 1 ♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 7-12.VIII.1987, leg. R. Puplesis.

Distribution : Mountainous areas of eastern central Asia (including the Kugitangtau mountains, Gissarskiy ridge and western and central Tian Shan).

Bucculatricidae

12. *Bucculatrix maritima* Stainton, 1851 (Fig. 20)

Diagnosis : Can be easily separated from other species of the genus by the clear white pattern of the forewing, which has characteristic white basal streaks. Valva of male genitalia with small subterminal process and arcuate apex. Lobes of tegumen short, slim and acute.

Material : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 15.VIII.1987, leg. R. Puplesis.

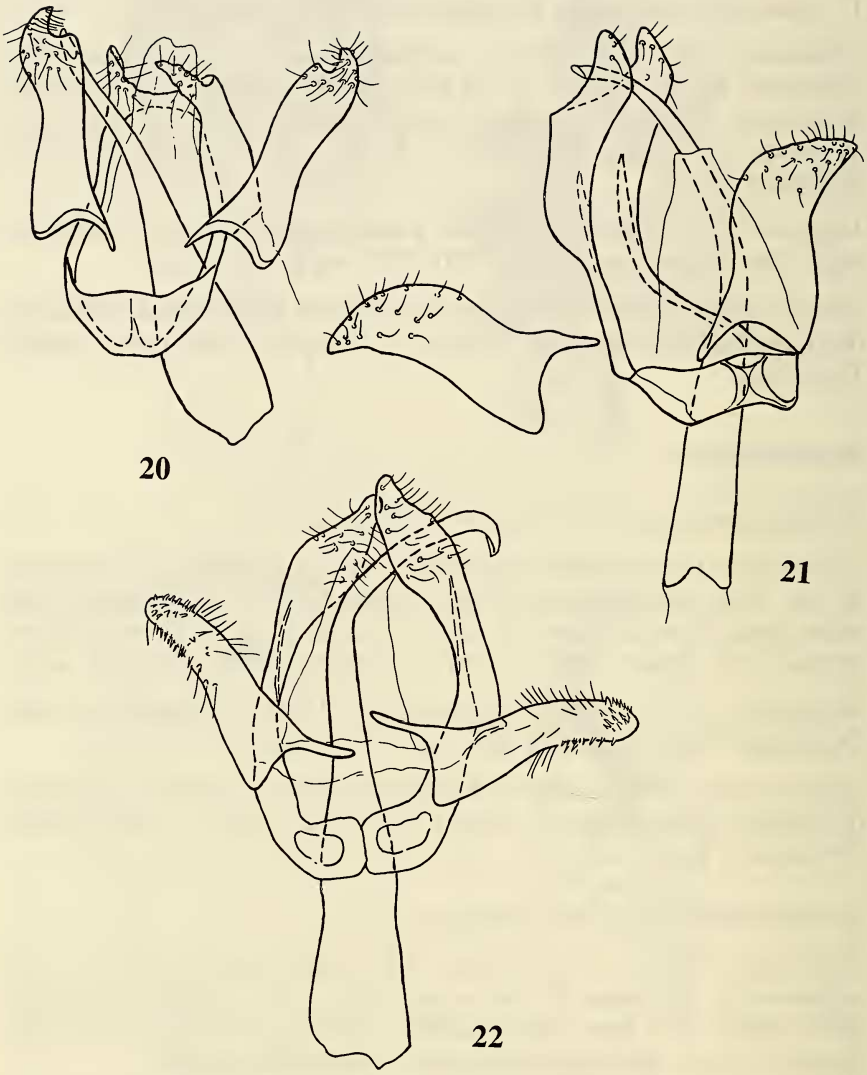
Distribution : Widespread in Europe and known from the Caucasus (Dagestan), eastern Siberia, western Tian Shan and far eastern Russia (Primorskiy Kray).

13. *Bucculatrix centaureae* Deschka, 1973

Diagnosis : More or less similar to *B. anthemidella* Deschka, but separated by the shape of the valva in the male genitalia. Forewings dark brown, with clear white pattern. Aedeagus arcuate. Valva comparatively wide, tapering towards apex, and slightly arcuate.

Material : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 11.VIII.1987, leg. S. Seksjaeva.

Distribution : Known from Makedonija, Crimea and now for the first time recorded from Central Asia.



Figs 20-23. Male genitalia of *Bucculatrix* spp. (Bucculatricidae) : 20 — *B. maritima* Stt. ; 21 — *B. centaureae* Deschka ; 22 — *B. tianshanica* Seksjaeva, sp.n. (scale : 0.1 mm).

14. *Bucculatrix tianshanica* Seksjaeva, **sp.n.** (Fig. 22)

Holotype : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 15.VIII.1987, leg. S. Seksjaeva.

Paratypes : 1 ♂, Turkmenistan, env. Takhta Bazar, 12.VIII.1988, leg R. Puplesis ; 1 ♂, same data, leg V. Sruoga.

Diagnosis : Closely resembles *B. gnaphaliella* Treitschke externally and in the genitalia, but separated by the shape of the aedeagus ; tegumen lobes narrower.

Male : Forewing length 6.0 mm. Head : tuft and eye-caps white, with pale admixture of yellowish scales. Forewing white, apex with golden scales and two costal and one dorsal golden spots. Antennal segments basally brown, apices golden.

Female : Unknown.

Male genitalia (Fig. 22) : Tegumen with somewhat arcuate and pointed lobes. Valva not pointed at apex ; many thin bristles and some short conical spines near apex. Vinculum split proximally, with transverse median suture. Aedeagus almost three times length of valva, arcuate beyond middle and again near apex.

Distribution : Possibly widespread in Central Asia, as it is known from the south-eastern part of the Karakum desert (Turkmenistan) and western Tian Shan (southern Kazakhstan).

15. *Lyonetia clerkella* Linnaeus, 1758 (Fig. 25)

Diagnosis : The species is distinguished by the presence of a dark spot near the apex of the forewing. Distal processes of the 8th segment widely separated from each other. Valva rounded at apex.

Morphological remarks : A bilobed sclerite, which had previously been recognised as a tegumen (Seksjaeva, 1981 : Fig. 397, 4), was later identified as a derivative of the 8th segment. This derivative was later designated the 8th tergite with distal extensions and unpaired proximal appendage (Kuznetsov & Stekolnikov, 1987). Tegminal lobes, which have been identified as the upper lobes of the valvae, are pointed and triangular in shape.

Material : 4 ♂♂, 5 ♀♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 4-15.VIII.1987, leg. S. Seksjaeva.

Distribution : Very widespread. Known from Europe, northern Africa and Madagascar, Asia Minor, Caucasus, Kazakhstan, Central Asia

(including northern India), southern Siberia, Primorskiy Kray, China, Korea and Japan.

16. *Leucoptera malifoliella* (Costa, 1836) (Fig. 23)

Diagnosis : Forewing pale grey. Two costal and one dorsal streak on forewing linked apically. Tegumen and vinculum of male genitalia strongly reduced, almost thread-shaped, joined as a narrow ring. Aedeagus spirally twisted.

Morphological remarks : The sclerite determined as a tegumen by Seksjaeva (1981 : Fig. 397, 3) appears to be obsolete weakly sclerotized lobes, probably androconial. The pair of wide lobes are either upper lobes of the valvae or pleural (Kuznetsov, Kozlov & Seksjaeva, 1988). The unpaired sclerite, bifurcated at its apex, has been identified as the gnathos or secondary transtilla.

Material : 3 ♂♂, 3 ♀♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 12-20.VIII.1987, larvae on *Malus sieversii*, leg. S. Seksjaeva.

Distribution : Widespread in the Palaearctic Region. Europe (except the northern part), northern Africa, Asia Minor, Iran, Caucasus to Central Asia, southern Siberia and China.

17. *Bedellia somnulentella* Zeller, 1847 (Fig. 26)

Diagnosis : Easily recognised by the wide lobe-shaped valva with bilobed apex. Forewing narrow, pale greyish with no markings.

Material : 3 ♂♂, 3 ♀♀, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 14-19.VIII.1987, leg. S. Seksjaeva.

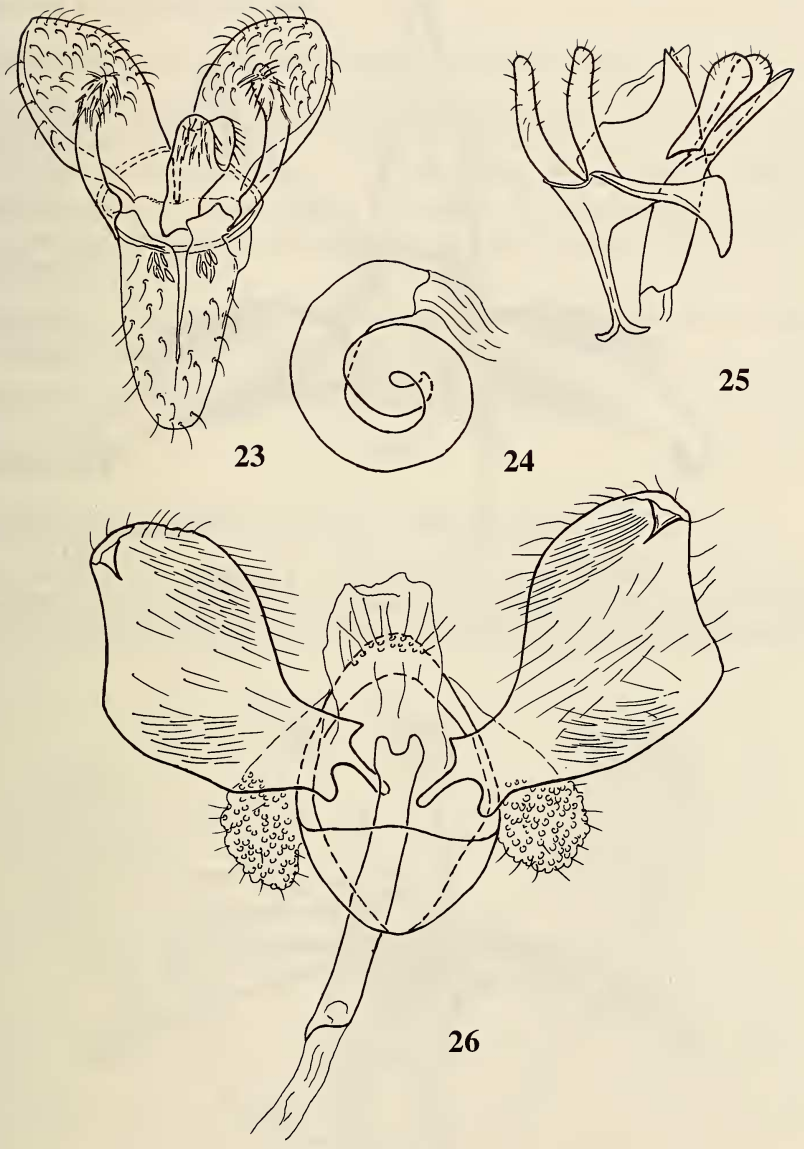
Distribution : Possibly a cosmopolitan species ; known from Europe and Africa to south, central and east Asia, southern Siberia, Australia, New Zealand, Oceanea and North America.

Gracillariidae

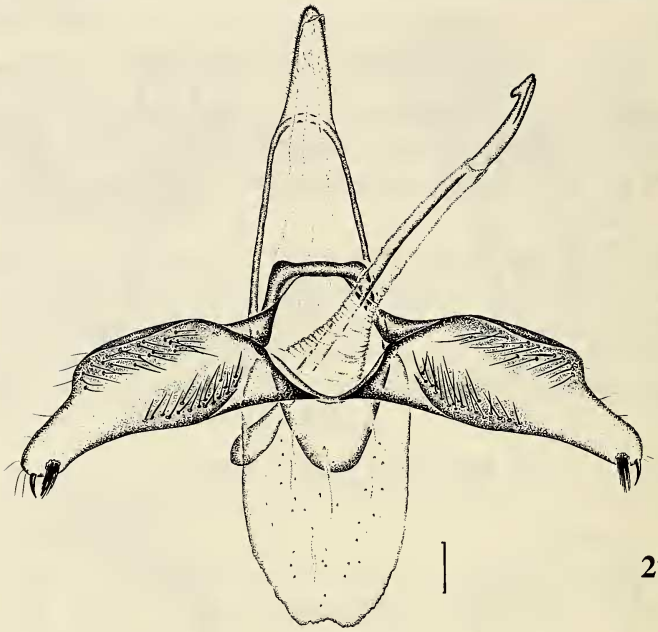
18. *Phyllonorycter pastorella* (Zeller, 1846) (Fig. 27)

Diagnosis : Externally closely resembles *Ph. armeniella* (Kuznetsov), but differs by the more distinct pattern of the forewing, presence of the 5th caudal and broader dorsal streaks. Male genitalia differing from *Ph. armeniella* by the broad valva with large apical spine.

Material : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 13.VIII.1987, leg. R. Puplesis.



Figs 23-26. Male genitalia of Lyonetiidae : 23 — *Leucoptera malifoliella* Costa, genital capsule ; 24 — the same, aedeagus ; 25 — *Lyonetia clerkella* (L.) ; 26 — *Bedellia somnulentella* (Z.) (scale : 0.1 mm).



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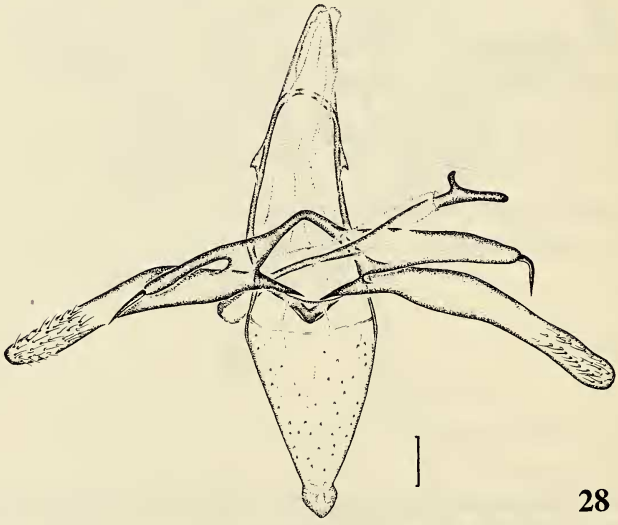

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Figs 27-28. Male genitalia of *Phyllonorycter* (Gracillariidae) : 27 — *Ph. pastorella* (Z.) ; 28 — *Ph. malella* (Grsm.) (scale : 0.1 mm).

DISTRIBUTION : Transpalaearctic species ; widely distributed from Europe east to Korea and Japan.

19. *Phyllonorycter malella* (GERASIMOV, 1931) (Fig. 28)

DIAGNOSIS : Externally resembles *Ph. blancardella* (FABRICIUS), *Ph. oxyacanthae* (FREY) and *Ph. cydoniella* (DENIS & SCHIFFERMÜLLER), but differs in the form of the forewing basal streak. Male genitalia resembles those of *Ph. mespilella* (HÜBNER), *Ph. blancardella* and *Ph. oxyacanthae*, but easily distinguished by the elongated distal end of the aedeagus.

MATERIAL : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 14.VIII.1987, leg. R. PUPLESIS.

DISTRIBUTION : Central Asia (Russia) and Kazakhstan

Elachistidae

20. *Elachista biatomella* (STAINTON, 1848) (Fig. 29)

DIAGNOSIS : Male genitalia resemble those of *E. martinii* HOFMANN, but differ by the very large posterior invagination of the uncus, shape of the juxta and gnathos, the aedeagus, which is not broadened basally,

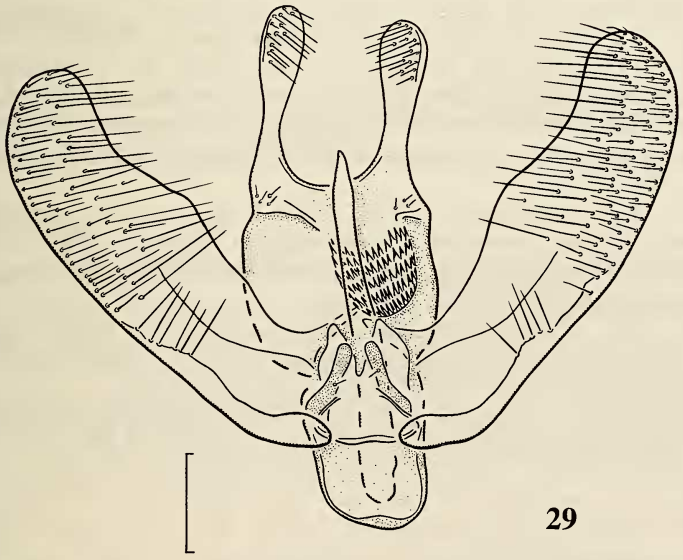

Fig. 29. Male genitalia of *Elachista biatomella* (STT.) (Elachistidae) (scale : 0.1 mm).

and the absence of cornuti. Externally distinguishable by the creamy white forewing with two small brown spots on the fold.

MATERIAL : 1 ♂, southern Kazakhstan, 90 km E. Chimkent, Aksu Dzhabagly Reserve, 12.VIII.1987, leg. R. PUPLESIS.

DISTRIBUTION : Well known from western and central Europe, including Great Britain and Italy.

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